

Burrowing Owl

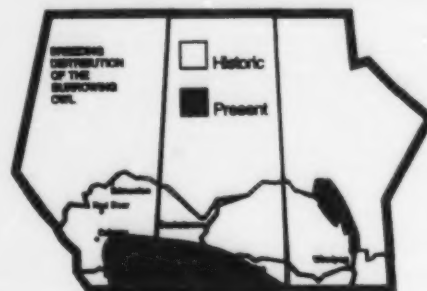


Brian K. Jeffery

Haven't heard of the burrowing owl? They have had many other names: The Ground Owl, Howdy Owl, Prairie Bobber, Rattlesnake Owl, Billy Owl, and Cuckoo Owl.

Burrowing owls (*Athene cunicularia*) are found in the open, well-drained grasslands, steppes, deserts, prairies and agricultural lands throughout North and South America. Across the prairies, this owl once nested. In vast expanses of unbroken prairie sod. More recently, over most of its range, it has either disappeared or has been confined to remaining patches of prairie land, including road allowances, railway rights-of-way, roadside ditches and grazed pastures.

It is estimated that fewer than 1,000 pairs now occur in Canada during the breeding season. Twenty-five years ago owls nested in the Canadian prairies from Lethbridge in the west to as far east as Winnipeg and north to Saskatoon and Yorkton, as well as in the interior grasslands of central British Columbia. Today, their distribution in Canada has contracted significantly, and most areas in the United States are also reporting declines. Burrowing owls have disappeared from British Columbia (where reintroduction efforts are underway) and Manitoba (3 pairs were reported in 1999 and no pairs in 2000), as well as from the northern areas of their former range in Alberta and Saskatchewan. The goal of the Canadian Burrowing Owl Recovery Plan is to maintain a stable or increasing population averaging 3,000 pairs in the prairie provinces.



The burrowing owl was designated as threatened in 1978 and endangered in 1995 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Saskatchewan listed the burrowing owl as endangered in 1999 under the *Wildlife Act, 1997*. The burrowing owl is now facing extirpation from the prairies unless conditions for its survival become more favourable.

A Burrowing What?

The words most often uttered when describing burrowing owls are comical and little. These small raptors (birds of prey) look like short fat owls on stilts. They have a typical "owl" head with large yellow eyes, relatively large wings, a short tail, and long thin legs. The larger short-eared owl is sometimes mistaken for a burrowing owl, but unlike the burrowing owl its nest is on the ground, usually concealed by vegetation, rather than in a burrow.

Burrowing owls exhibit a mottled pattern of dark and light brown with white spots. The underparts are pale brown to white. Most of the time, males are indistinguishable from females. However, in the spring the male is more likely to be visible because the female is below ground laying or incubating eggs. The extra time that males spend above ground, and hence extra exposure to the sun, bleaches their plumage to a lighter colour than females. Once incubation is complete, females spend more time above ground, and their plumage bleaches to the same colour as the males.

The burrowing owl is about the same size as a robin and weighs between 125 and 185 grams. Breeding begins at one year of age. The oldest known owl in North America in the wild is eight years old (determined from band returns), and the oldest known bird in captivity is 15 years.

A Year in the Life of a Burrowing Owl

Burrowing owls arrive on the prairies around the third week of April. Males select a nest burrow and try to attract a female by calling *coo coooo*, and by establishing prey caches consisting primarily of small mammals such as mice and voles. These spring time caches usually contain the largest number of prey items. In 1997, when meadow voles were extremely abundant, a cache from one nest contained 218 prey items.

Once the pair is established, the owls modify the burrow and line the tunnel and chamber with dried manure. The absorbent qualities of the manure help to protect nests from flooding.

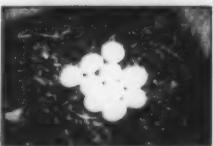
Egg laying occurs between late April and late May, shortly after pair bonds are established. The female lays on average 9 eggs (range 6 to 11 eggs) laying one egg every 36 hours. Females that begin laying later in the season typically have smaller clutch sizes.



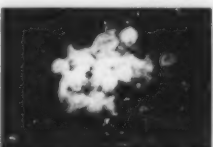
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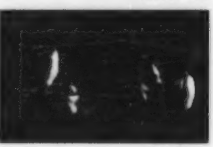
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Once the fourth or fifth egg is laid, females begin incubation. Males do not incubate. Eggs hatch after about 26 to 30 days of incubation. The first 4 or 5 eggs hatch on the same day. Subsequent eggs hatch between 2 to 6 days later, resulting in age differences among the nestlings. If there are natural food shortages, the youngest chicks in the nest may die or are killed by their siblings or parents, and are used as food.

Initially, hatchlings are "helpless," relying entirely on their parents for warmth and food. However, development occurs rapidly. Young are first seen at the entrance of the burrow between 2 to 3 weeks after hatching. They begin to move to nearby burrows at about 25 days, and can fly at about 50 days of age. The juveniles become relatively independent of the adults - a bit like teenagers - between 60 to 70 days after hatching.

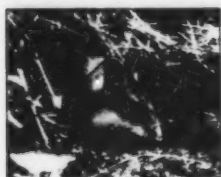
Burrowing owls migrate south from early September to mid-October. Migration occurs primarily at night. Further research is needed to provide information on owl habits along migration and in wintering areas.

There's no Place Like Home

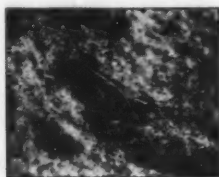
Three key characteristics of burrowing owl nesting habitat are: availability of burrows, short or grazed vegetation, and wide-open spaces. In Saskatchewan, most of the burrow sites are located on lacustrine (old glacial lake bottom), solonchic (hardpan or claypan), saline (high in soluble salts) and alluvium (deposited where flowing water enters a water body through past glacial activity or in present day river systems) soils that have few rocks. These same soils are excellent for farming. Owls rely on other burrowing mammals for their burrows. They will nest in Richardson's ground squirrel (gopher) and black-tailed prairie dog burrows, badger excavations, and occasionally fox dens. Grass height is more important than grass species composition. Grasses kept short by climatic conditions, grazing, haying, mowing, or burning are preferred.

Burrowing owls exhibit strong site fidelity, often returning to the same nesting areas over consecutive years. From one breeding season to the next, adult males show the strongest site fidelity, followed by adult females, juvenile males and juvenile females.

Burrowing owls require more than an open area surrounded by short vegetation with adequate burrows. They also need enough permanent cover and tall undisturbed vegetation within their home range to support a sufficient population of small mammals and other prey. During the day, owls forage mostly on insects close to the burrow. At night, however, when the majority of foraging occurs, the owls fly to locations with larger small mammal (meadow voles, deer mice) abundance. These habitats more often include uncultivated fields, ungrazed areas, wet meadows/riparian areas and roadsides rather than seeded fields and heavily-grazed pastures. During the nesting period, males do the majority of the hunting.



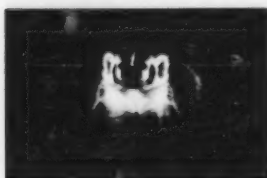
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What's for Lunch?

The Burrowing owl is a generalist predator. Anything that moves and is small enough to catch is fair game. Insects, mice, voles, young ground squirrels, toads, snakes, salamanders and small birds have all been found cached at the burrow. However, owls generally hunt prey that is most abundant. Early in spring, mice and voles are an important component of their diet. Later in the summer, grasshoppers become more abundant and are particularly important for fledglings learning to hunt on their own.



Lorne Scott



Danielle Todd

On the Menu Today - Burrowing Owl

Burrowing owls have many predators. There are predators that eat eggs, nestlings or adult females in the burrow during the nesting period. These include American badgers, red foxes, striped skunks, least and long-tailed weasels, raccoons, prairie rattlesnakes, and bull snakes. Although badgers are a major predator, their digging activity is essential in creating nest sites and escape cover.

Other predators prey on older nestlings and adults above ground. These include coyotes, domestic dogs and cats, and raptors (Swainson's hawks, ferruginous hawks, red-tailed hawks, great horned owls, northern harriers, short-eared owls and prairie falcons).

Limiting Factors

Factors which increase mortality or decrease productivity (survival of eggs and young) limit burrowing owl populations. Low productivity is a crucial factor that has been identified as driving the burrowing owl population decline, and is related to habitat loss, fragmentation and change. Factors related to human activities are important to consider because these are ultimately the factors that can be addressed to reverse the population decline.

1. Habitat loss

Unfortunately, the same land that burrowing owls favour is also favoured for farming. The conversion of grassland to crop land has been substantial in the last century. Less than 25% of native prairie remains in Saskatchewan, with less than 2% remaining in some of the more arable municipalities.

2. Habitat fragmentation and change

In many areas, large expanses of pasture have been replaced by fragmented patches. Habitat fragmentation likely affects movement of individuals between sites, thus affecting pairing and dispersal. However, in some areas vast expanses remain, particularly in the southwest of the province. Habitat loss and fragmentation do not explain the unexpectedly low numbers in these areas.

Many predators are thriving on the prairies (red fox, coyote, striped skunk). Fragmented patches of grassland make it easier for predators to search for and find burrowing owls and their nests. Also, some avian predator populations (ie. red-tail hawks) have increased along with the increase in trees on the prairies, a result of fire suppression and planting.

3. Food Shortage

The abundance of primary food items for burrowing owls (small mammals such as voles and mice, and insects such as grasshoppers and beetles) has been adversely affected by changes on the prairies that include cultivation, loss of riparian (wet) areas and use of pesticide.

Research throughout the 1990's showed that providing additional food (dead lab mice) during the nesting period significantly increased the number of fledglings produced by owl pairs. In addition, abundant food may increase the overall fitness of adult and juvenile owls prior to migration and provide an alternate prey source for owl predators.

4. Fewer burrow providers

In many areas, burrowing mammals such as badgers and ground squirrels are not tolerated. Elimination of burrowing mammals (eg. through poisoning) results in fewer burrows for owls and eliminates an alternative food source for owl predators. In addition, owls may be mistakenly shot in attempts to control burrowing mammal populations.

5. Collision with vehicles

Each year burrowing owls are killed as a result of collisions with motor vehicles. Juvenile owls are especially vulnerable because they often hunt for insects on roads, sometimes re-using the same locations. Operation Burrowing Owl (OBO) is trying to reduce this problem. Upon a landowner's request, OBO will provide road signs that warn motorists to reduce their speed along stretches with nearby nesting owls.

6. Pesticides

Pesticides can affect the population by causing mortality, reducing productivity, decreasing availability of prey, or by reducing the number of burrowing mammals. Research is needed on the effects of all pesticides being used in Canada, the United States, and Mexico on burrowing owls.



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For example, the liquid formulation of carbofuran, controlling for grasshoppers, was shown to have a significant impact on survival and reproductive success of burrowing owls. During a study, nests within 50 m of a field being sprayed with carbofuran fledged half as many young, and had a 50% reduction in the proportion of pairs successfully raising one or more young relative to control nests. Also, use of carbofuran likely decreased food availability. Due to its toxic effects on the owls and other wildlife, and successful lobbying by conservation organizations such as World Wildlife Fund, liquid carbofuran was deregistered as a grasshopper control in 1995. In 1998, granular carbofuran used on canola was also deregistered.

7. Mortality on migration and in wintering areas

Burrowing owl survival may also be affected by conditions along migration routes and in wintering areas. Conversion of prairie to farmland is even more extensive in the southern United States and in Mexico, where Canadian owls likely winter, than on the Canadian prairies. Our more northern owls are possibly forced to crowd into the remaining less suitable habitat in those areas. In addition, the extensive eradication of prairie dog colonies in the United States and Mexico where burrowing owls are often found, has likely had a detrimental effect. These and other habitat changes may have reduced the owl's food supply and increased predation pressure on migration and in wintering areas.

Recent banding and radio-telemetry studies have not yet located major wintering areas of Canadian burrowing owls, and thus their survival there is unknown. A concentration

of burrowing owls that may include Canadian owls has been identified in central Mexico, by Canadian and Mexican biologists. Observations of marked birds indicate that all the owls in the study area survived the winter and migrated north in March. Research is continuing to determine habitat use, survival, and origin of these owls.

Overwinter mortality is difficult to measure for migratory species that do not return to the same location each year. It is usually estimated based on banded birds returning to the breeding grounds. Mortality is overestimated if all surviving birds do not return to their previous nesting area (ie. nest fidelity is not 100%) because birds leaving the study area are counted as dead.

In the Regina Plain, 31% to 35% of banded owls returned to the study area, suggesting a maximum estimate of overwintering mortality of adult owls of 65% to 69%. However, it may be lower if some of the owls migrated to other locations.

Can I do Anything to Help?

Here are some actions the public can take to benefit the burrowing owl and our prairie ecosystem:

- Be informed by joining a conservation organization.
- Become actively involved by volunteering your time and skills to conservation programs.
- Support conservation through charitable donations.
- Support sustainable agricultural practices. Buy low chemical, locally produced foods, and range-fed livestock.
- Acknowledge and commend sponsors and partners of burrowing owl and prairie conservation programs.
- Write letters to encourage habitat conservation and support for species at risk programs.
- Practice the 4R's (reduce, reuse, recycle and recover).

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